pendulum; (4) the Wiechert pendulum, weighing 1000 kilometers, with a mechanical register; (5) the three-component microseismograph of Vicentini; (6) the Omori horizontal pendulum; (7) the Bosch horizontal pendulum (tromometer) weighing 100 kilograms; (8) the triflar gravimeter of August Schmidt.

These instruments, which are all in active use, are giving accurate comparative observations; their seismograms, when carefully discussed, form a valuable collection.

The instruments and records of the central station are at the disposal of foreign visitors, especially citizens of the States associated in this work, who wish to use them for special study, with the restriction that the regular records of the instruments are to be undisturbed. The workrooms of the central bureau are open to foreign visitors for scientific, practical, or theoretical researches; the collection of seismograms of the central station may always be consulted by them.

In accordance with these provisions the geophysicist and seismologist, Doctor Pécsi, was sent by the Hungarian government to study at the central bureau for several weeks in order that he might make use of the records, with the assistance of the personnel of the central bureau and the central station. Professors Omori and Michailovitch intend to work at the central bureau for some time.

The principal work of the central bureau, as prescribed by its director, is at present directed toward the study of apparatus, and has for its object the enlargement of our knowledge of instruments and improvements in their use. Negotiations have been begun for the purpose of engaging a seismologist of great reputation to pursue extensive works of this nature at the central bureau with the apparatus of the central station.

These two institutions are distinct organizations, but their work is along parallel lines. The Imperial German Central Station places at the disposal of the Central Bureau of the International Seismological Association its instruments, its records, and in part its quarters; and on the other hand the central bureau, its rooms, and its personnel are of considerable service to the central station. Much work that is of great importance to the better understanding of the seismometry of our globe, which is the principal object of the Seismological Association, could only be carried on by the active cooperation of the two institutions, and work of all kinds is facilitated by this combined activity.

Literary works also are incumbent upon the central bureau; several have already been completed or are about to be; these works have as a basis the records and the researches of the central station. The central station is publishing at the present time, in the Beiträge zur Geophysik, a catalogue of all the microseismic earthquakes known to have occurred in eastern Asia; this catalogue, composed by Professor Rudolph, will be continued. The catalogue of earthquakes observed during the year 1903, begun by Rudolph (Beiträge zur Geophysik, Supplement III), will be continued for following years by the central bureau and a catalogue of all microseismic movements will be prepared.

In order that these works may be as complete as possible, the central bureau earnestly requests all delegates appointed by the cooperating nations to see that the most exact information regarding seismological observations in their respective countries be transmitted to the central bureau at the end of each half year, or better still, each quarter year. The most practical manner of attaining this object will be to send copies of all seismic perturbations of considerable importance registered by the different stations; they will be preserved at the central bureau and will be placed at the disposal of all who need them in their studies or researches.

The central bureau will also be much pleased to receive published works bearing on seismology, particularly investigations of different countries or of the entire globe. These works will form the nucleus of the future library of the central bureau.

ASTRONOMY *versus* METEOROLOGY.

The Astronomical Association, organized in 1865 in Germany, and the Royal Astronomical Society of London, organized in 1820, publish annually condensed reports of the work done by the more prominent astronomical observatories in the world. The last number of the Notices of the London society and the last Vierteljahrschrift of the German society give such reports from 27 English and 39 continental institutions, respectively. Although astronomy is the prime work of all of these, and although some of them necessarily pay special attention to atmospheric conditions, in so far as they affect astronomical work, yet only a few maintain regular meteorological observations comparable with those of our regular stations. Nevertheless the fact that 13 out of the 27 English, and 10 out of the 39 continental observatories do maintain such series is an interesting evidence of the intimate relation between the two branches of science. In many of these cases the meteorological record is continued by the observer as a pious duty, in view of its having been begun many years ago when the astronomer was the accurate observer of all geophysical phenomena, and when men looked to him for information with regard to earthquakes, terrestrial magnetism, and the weather, as well as the stars. In recent years each of these has become a special branch of science, requiring a special building and instruments. It is, however, very fortunate for meteorology that the astronomer, with his accurate instruments, can frequently give measurements from which meteorologists derive great benefit. Very few of the latter have at hand apparatus for determining the exact angular dimensions of halos, the absorption bands due to the air and the vapor, the exact location of a meteor train, the altitude and azimuth of the twilight arc, the degree of polarization of the skylight, or the ordinary phenomena of refraction and the extraordinary refractions of the mirage. For information on these and other points we generally depend on the astronomer, or some individual physicist; but it is to be hoped that we may eventually have many meteorological institutions where these matters are properly attended to. The so-called regular observations, that have been made since the days of Ferdinand II, the Grand Duke of Tuscany, who organized the first system of stations in 1653, certainly need to be supplemented by observations in every field that modern science has opened up to meteorological research.—*C. A.*

RECENT PAPERS BEARING ON METEOROLOGY.

H. H. KIMBALL, Librarian.

The subjoined titles have been selected from the contents of the periodicals and serials recently received in the Library of the Weather Bureau. The titles selected are of papers or other communications bearing on meteorology or cognate branches of science. This is not a complete index of the meteorological contents of all the journals from which it has been compiled; it shows only the articles that appear to the compiler likely to be of particular interest in connection with the work of the Weather Bureau. Unsigned articles are indicated by a ——

Bulletin of the American Geographical Society. New York. Vol. 38. Aug., 1906.

Ward, Robert DeC[ourcy]. The classification of climates. II. Pp. 465-477.

Journal of the Meteorological Society of Japan. Tokyo. 25th year. July, 1906.

Takagi, T. On the dust-haze (Hoang sha) in the Yangtze Valley. [Japanese.]

London, Edinburgh, and Dublin Philosophical Magazine. London. 6 ser. Vol. 12. Sept., 1906.

Eve, A. S. On the radioactive matter in the earth and the atmosphere. Pp. 189-200.

Nature. London. Vol. 74. Aug. 30, 1906.

—— Meteorological kites in India. P. 448.

Physical Review. Lancaster. Vol. 23. Aug., 1906.

Joslin, Lulu B. The contemporaneous variations of the nucleations and the ionization of the atmosphere of Providence. Pp. 154-165.

Science. New York. New Series. Vol. 24. June 24, 1906.

Smith, D. T. The source of the energy of cyclones. Pp. 247-248.

Science Abstracts. London. Vol. 9. Aug., 1906.

B[utler], C. P. Eclipse shadow bands. [Abstract of article by M Roso de Luna.] P. 402.

Scientific American. New York. Vol. 95. Aug. 25, 1906.

—— The effect of the sea upon climate. Pp. 130-131.

Annuaire de la Société Météorologique de France. Paris. 54 année. Avril 1906.

Moureaux, Th. Observations magnétiques pendant l'eclipse de soleil du 30 août 1905. Pp. 113-115.

Besson, Louis. Halos et taches solaires. Pp. 115-119.

Angot, Alfred. Régime pluviométrique de la Méditerranée. II. Tripolitaine. Pp. 119-122.

Goutereau, Ch. Sur la variabilité de la température. Pp. 122-127.

Marchand, E. L'électricité atmosphérique au Pic du Midi (2860 m.). Pp. 137-146.

Brunhes, Bernard. Sur la dissymétrie de la déperdition électrique en montagne. Nouvelles observations faites aux environs de Nauriac. Pp. 147-149.